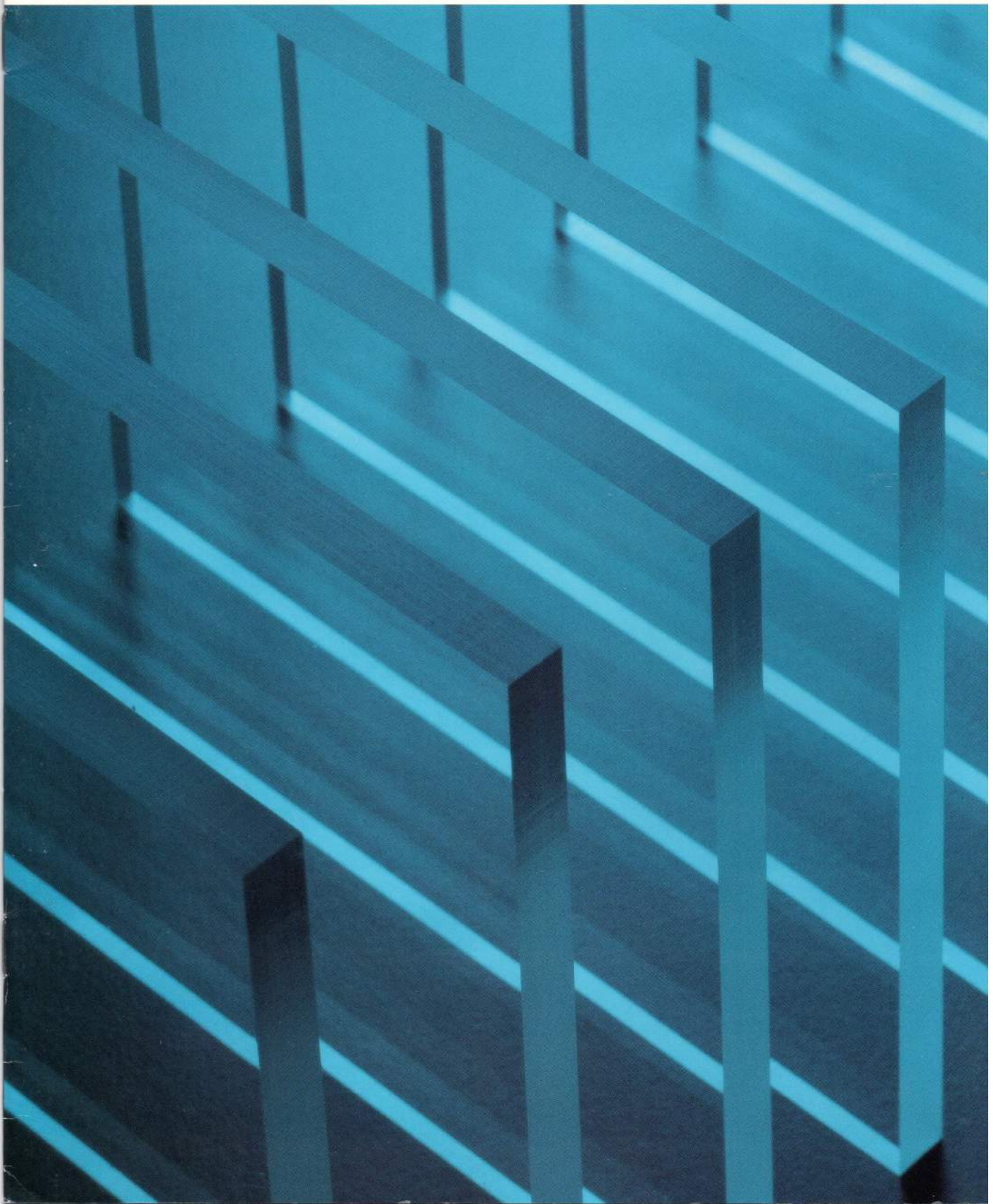


amdaahl

5890 Processors



The Amdahl 5890: A Proven Price and Performance Leader

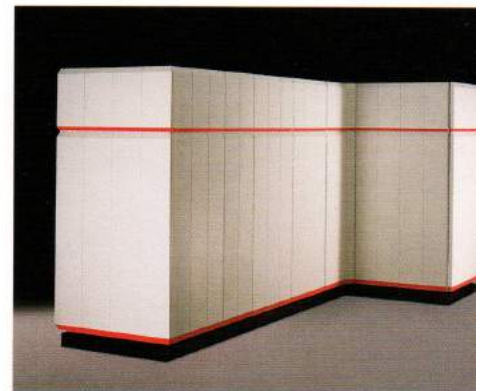
The Amdahl 5890 Series offers large-systems users superior value in large-scale processing. Among their many advantages, the 5890 models provide proven design and technology, impressive performance, outstanding reliability, smooth upgradeability, innovative features, and Amdahl's commitment to compatibility with industry-standard system architecture.

Furthermore, our intent of offering customers the option of updating earlier models with appropriate new features protects the customer's initial investment and prolongs the useful life of the processor.

The 5890 Series consists of the following models:

- 5890-180E Uniprocessor
- 5890-190 and 5890-190E Uniprocessors
- 5890-200 and 5890-200E Dual Processors
- 5890-300 and 5890-300E Dual Processors
- 5890-390E two-way Multiprocessor
- 5890-400E three-way Multiprocessor
- 5890-600E four-way Multiprocessor

The 5890 models continue Amdahl's tradition of serving both the present and future performance needs of customers. The very attractive price/performance benefits and flexibility offered by the 5890 processors make them excellent choices for organizations requiring wide-ranging, powerful data processing capabilities.



High-Performance Technology to Achieve Effective Operation and Quick Response Time

The 5890 processor models use high-performance components to deliver fast, efficient, reliable processing power. The design minimizes both the number of components and the interconnections between components to increase operational effectiveness.

What's more, the 5890 Series has undergone two performance enhancements since its introduction in late 1985. Taken together, these boosts represent a total performance improvement of up to 14 percent.

Following are the technology and design features that contribute to the 5890 Series' outstanding performance characteristics:

■ *High-performance chips.* The 5890 models incorporate 400-circuit and 1,000-circuit large-scale-integration (LSI) logic chips with a switching speed of 350 picoseconds. In addition, 4-kilobit (kb) random-access-memory (RAM) chips with a 3.5-nanosecond (ns) access time reside within each central processing unit (CPU) for both high-speed buffers and microcode control storage. Other RAM chips with a 16-kb capacity and a 15-ns access time accommodate additional buffers and microcode control storage. High-capacity 256-kb RAMs reside in main storage, where they permit a more compact main storage unit design while still allowing rapid (80-ns) access to main storage data.

■ *Fast machine cycle time.* A machine cycle time of 15 ns results in rapid instruction execution.

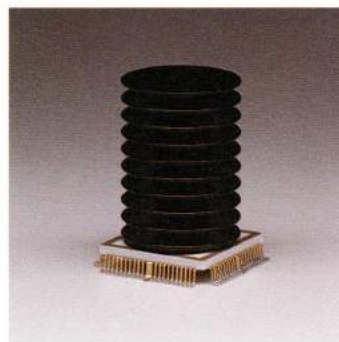
■ *Advanced packaging techniques.* Multiple chip carriers (MCCs) contain a combination of up to 121 logic and RAM chips mounted on a 14-layer board used for inter-chip communication. The three-dimensional stacks housing the MCCs facilitate inter-MCC communication.

■ *Two channels on a board.* Double-density channel interface handlers provide two channels on one printed circuit board, so more channel interfaces fit in less space.

■ *Shared channels and storage.* Dual processor and multiprocessor CPUs share main storage and channels, enabling these processors to operate under a single system control program (SCP) to allow concurrent execution of two, three, or four independent instruction streams.



The 5890 processors use 4-kb RAM chips like this one. Access time is just 3.5 nanoseconds.



The 5890 processors use 1,000-circuit LSI logic chips with a fast switching speed of 350 picoseconds.

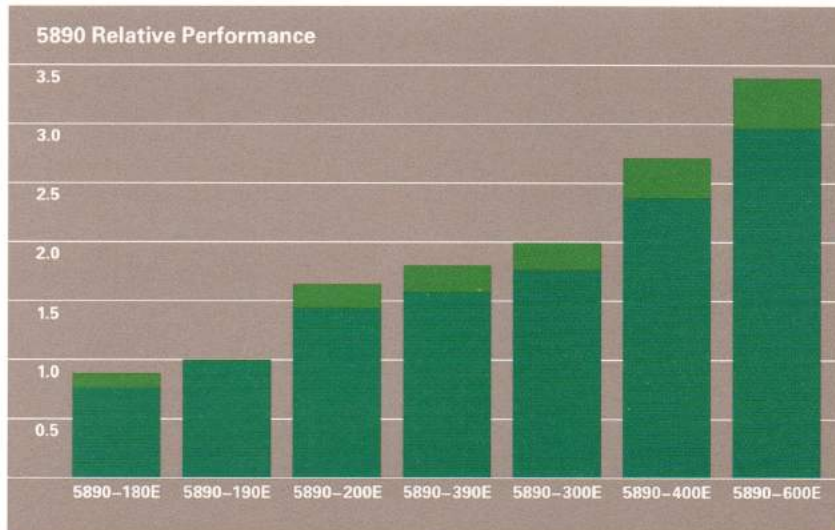


The 14-layer design of the 5890 MCCs facilitates interchip communication and improves performance. All 5890 components are air cooled.

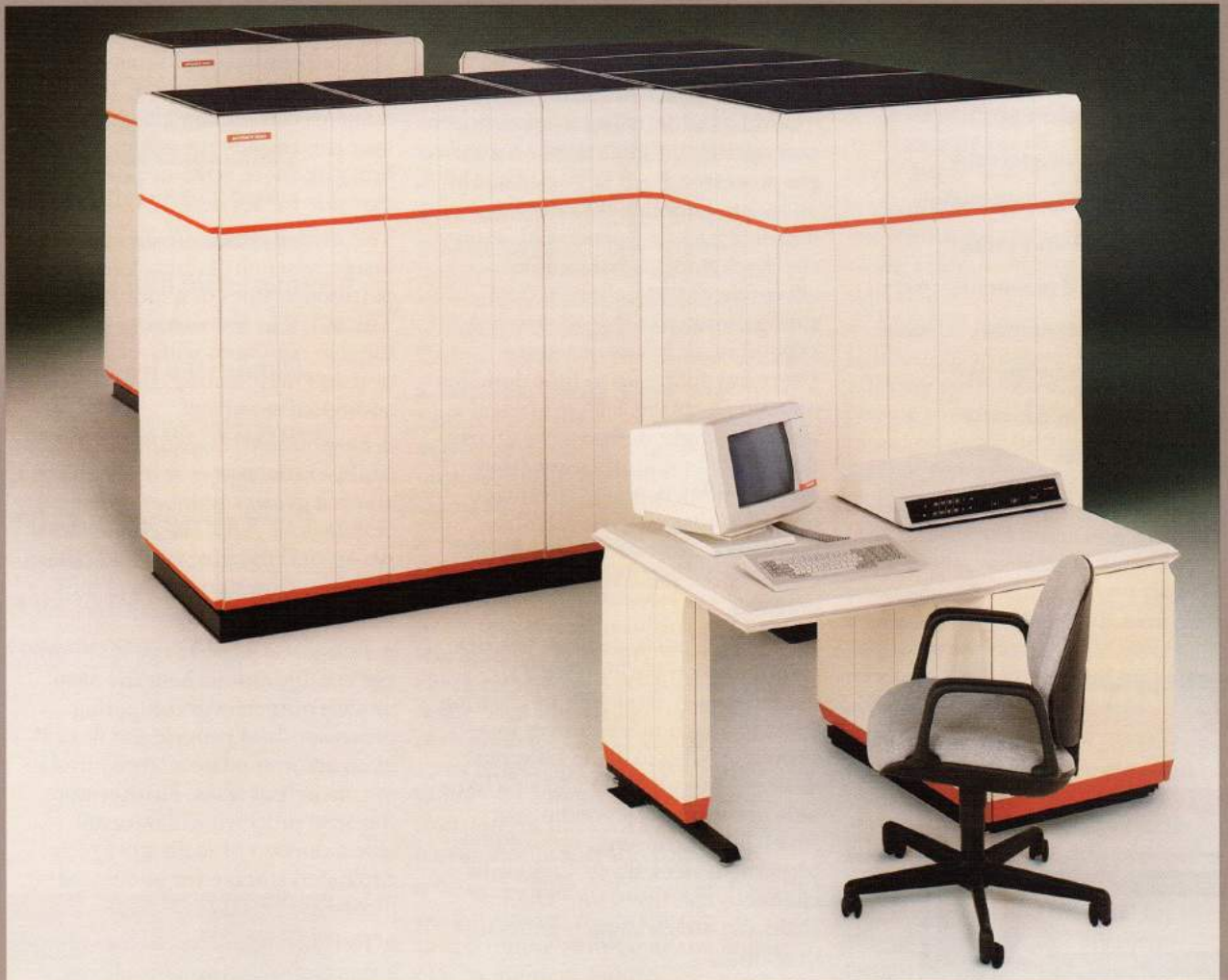
■ *Air cooling.* The 5890 processors are air cooled, simplifying environmental and installation requirements. These minimal cooling requirements compare favorably to those of competitive processors.

■ *Instruction pipelining.* To optimize throughput, a pipelined CPU design allows up to five instructions to be in separate stages of execution in each CPU simultaneously.

■ *High-speed buffers.* Each CPU has two high-speed buffers—a 64-kilo-byte (KB) buffer for operands and a 32-KB buffer for instructions—to optimize the instruction execution rate.



*Workloads used to measure relative performance are approximations of true production workloads. Relative performance for a specific customer workload will vary depending on the specific application and operating environment.

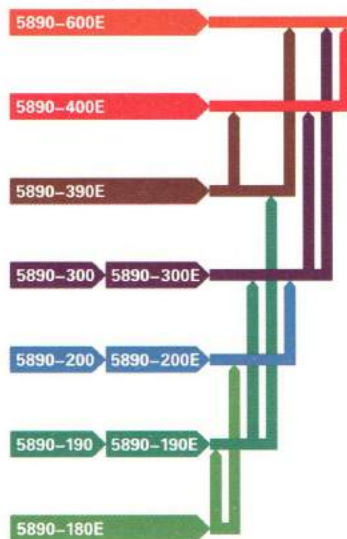


Amdahl 5890-300E Dual Processor.

Flexibility to Maximize Resources and Permit Future Growth

The 5890 processors boast a number of features that help users expand the capabilities of their systems and optimize specific processing environments and tasks. A full range of powerful models allows users to upgrade in cost-effective steps as their needs and growth require.

5890 Upgrades



Important 5890 flexibility features include:

■ *Multiple Domain Feature (MDF).* The optional MDF lets users define and operate multiple SCPs on a single processor. Each SCP operates in an isolated domain that provides data integrity and processing security. Each domain has its own allocation of CPU, channel, and storage resources that the user can expand or shrink as necessary. Users can define up to four domains on a single-image 5890 processor and up to eight domains on a partitioned 5890 multiprocessor (four on each side). A major advantage of MDF is that only *one* software license is required to run multiple copies of the same SCP in different domains.

A new MDF enhancement, the I/O Configuration Facility (IOCF), increases MDF flexibility by allowing users to attach more devices to a processor—up to 16,384 physical devices, with up to 65,536 subchannels per system. Depending on which SCP is running, up to 4,080 physical devices, up to 4,080 subchannels, and up to four channel paths can attach to each individual domain.

As an additional advantage, IOCF permits each domain to have an I/O configuration data set (IOCDS) that is independent of any other domain. Either identical or different device addresses can be used in multiple domains. Thus, for example, a user could set up both a production and a test domain and select identical device identifiers in both domains to improve testing validity.

■ *Dynamic partition and join.* Dynamic partition allows a user running a multiprocessor in single-image mode to vary one side of the system offline, while still leaving

any SCP that supports partition and join running on the online side. If the processor has MDF, the domains can remain active. The user can employ the offline side to bring up more SCPs, or power off that side for service.

The user may also create a single-image system by joining two partitioned sides of a multiprocessor. The SCP that was running before the join continues without disruption and may assume control of the additional resources.

■ *Large channel configurations.* These configurations permit users to access a greater number of peripheral devices. A 4.5-megabyte (MB)-per-second transfer rate and data streaming are standard on block multiplexer channels.

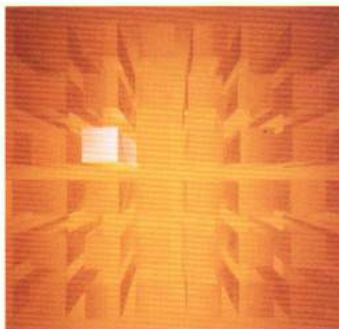
■ *Processor storage.* Large main storage configurations help the 5890 models outperform competing processors and provide the flexibility to accommodate a large number of concurrent tasks. Furthermore, the 5890 processors make available a portion of main storage as expanded storage for additional flexibility.

■ *Field upgradeability.* To provide a significant performance boost without replacing the system, a flexible growth scheme offers users the option of field upgrading 5890 uniprocessors to dual processors, and dual processors to multiprocessors, as the need arises. Moreover, the 5890-190, 5890-200, and 5890-300 are field upgradeable to their corresponding 5890E models.

Refinements in RAS to Ensure System Uptime

Processor reliability, availability, and serviceability (RAS) are crucial to any organization's data center. The highly reliable 5890 processor components provide users with the assurance that their systems will run with minimal interruption.

Plus, backing up each system is Amdahl's unsurpassed service organization, which has consistently ranked at the top of independent customer surveys.



Special 5890 RAS features include:

- *LSI technology.* LSI circuitry increases reliability because fewer components mean fewer failures and more efficient fault isolation and repair.
- *Functional packaging.* A compact packaging design minimizes the number of connections within the system and reduces the likelihood of failure, while permitting rapid fault isolation if an error does occur.
- *Advanced console design.* The 5890 console uses LSI circuitry and a minimum of components to improve reliability and facilitate access by service people.
- *Superior error checking.* Recovery enhancements improve the capability of the 5890 processors to bypass or correct errors, resulting in excellent system availability. The error checking and correction (ECC) technique used involves single-bit error correction (SEC) and double-bit error detection (DED). Each functional unit contains its own error-isolation circuitry for easier problem identification and correction.
- *Varying offline.* Channels and portions of main storage can be varied offline to mitigate the impact of a component failure.
- *Redundant components.* Redundant components in the 5890 processors limit unscheduled interruptions and allow processing to continue undisturbed.
- *Independent monitoring.* An independent service processor monitors system events recorded by history RAM chips and provides diagnostic assistance by keeping an extensive event log of system activity.
- *Automated analysis.* Analytical tools use logout data to diagnose errors to the relevant field-replaceable unit (FRU).
- *Advanced power supplies.* Small, lightweight switching power supplies are easier for maintenance people to work with, take up a minimum of space, and offer a high level of reliability.
- *Amdahl Diagnostic Assistance Center (AMDAC®).* Customers may link their 5890 processors to a console processor at AMDAC, where highly trained specialists in both hardware and software can provide timely recovery instructions and diagnostic assistance to customers' sites.
- *Failure Analysis System (FAS).* This facility processes failure data and transmits it to a corporate data base, allowing AMDAC specialists to observe trends and provide preventive action. FAS tracks and checks machine configurations and the FRU for proper hardware and microcode design levels, and also provides remote fix and update capabilities.

The 5890 processors employ superior error checking and correction techniques that maximize reliability by isolating errors within functional units.

A Tradition of Compatibility to Protect Investments

Amdahl's proven commitment to compatibility with industry-standard architectural modes protects the customer's investment in hardware, software, and people.

Amdahl's commitment to compatibility is exemplified by:

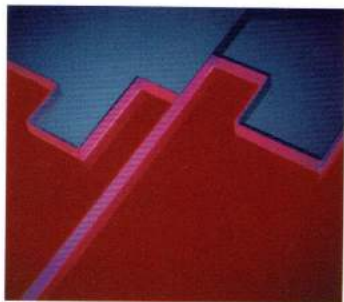
■ *Compatibility with industry standards.*

The flexible 5890 processor implementation provides compatibility with System/370, System/370-Extended Architecture (XA), and Enterprise Systems Architecture/370™ (ESA/370™) architectural modes.

■ *Ability to run popular SCPs.* The SCPs listed below run on the 5890 processors. Specific details regarding SCP release levels are discussed in the software announcement that Amdahl publishes periodically. Amdahl will announce details about running MVS/ESA™ on 5890 processors after the MVS/ESA software and further information about ESA/370 become available from IBM.

- UTS® (an Amdahl native-mode implementation of AT&T's UNIX®)
- VM/System Product High Performance Option (VM/SP HPO)
- VM/XA System Facility (VM/XA SF)
- VM/XA System Product (VM/XA SP)
- MVS/System Product Version 1 (MVS/370)
- MVS/System Product Version 2 (MVS/XA)
- MVS/System Product Version 3 (MVS/ESA)

Although some of these SCPs do not normally run on certain large processor configurations, customers can use Amdahl's optional MDF to run the SCP within an appropriately configured domain. MDF also permits users to operate dissimilar architectural modes—System/370, System/370-XA, and ESA/370—concurrently on the same processor.



*The 5890 Series demonstrates
Amdahl's commitment to
compatibility with industry-standard
architectures.*

Specifications

Configurations

Models	5890-180E 5890-190 5890-190E	5890-200 5890-200E 5890-300 5890-300E	5890-390E	5890-400E	5890-600E
Main Storage (MB)					
32	■				
64	■	■			
96	■	■			
128	■	■		■	■
192	■	■		■	■
256	■	■	■	■	■
384			■	■	■
512			■	■	■
Channels					
16	■				
24	■				
32	■	■			
40	■	■			
48	■	■			
64		■	■	■	■
80			■	■	■
96			■	■	■
112				■	■
128					■
Byte Multiplexer Channels					
Standard	0	0	0	0	0
Optional	12	16	24	28	32
Block Multiplexer Channels					
Standard	16	32	64	64	64
Optional	32	32	32	48	64
Main Operator Consoles	1	1	2	2	2
Power Distribution Units	1	1	2	2	2
Options					
Multiple Domain Feature (No. of Domains)					
Single Image	4	4	4	4	4
Partitioned	—	—	8	8	8
Remote Operator Consoles	3	3	6	6	6
Channel-to-Channel Adapters	4	4	8	8	8
Hardware Monitor Attachment Feature	1	2	2	3	4

Physical Characteristics

Models	5890-180E	5890-200	5890-390E	5890-400E	5890-600E
	5890-190	5890-200E			
	5890-190E	5890-300			
	5890-300E	5890-600E			
Configuration:					
Main Storage (MB)					
x Channels	32 x 16	64 x 32	256 x 64	128 x 64	128 x 64
Power Capacity					
Requirements (kVA)					
50 Hz	7.4	8.4	14.8	15.8	16.8
60 Hz	7.1	8.2	14.2	15.3	16.4
400 Hz	21.6	33.6	47.6	57.4	67.2
Heat Dissipation					
kBtu/hr	68.5	93.0	148.8	167.4	186.0
kW	20.1	27.3	43.6	49.1	54.5
Floor Space, including all support frames					
Without Service Clearance					
ft ²	81.1	81.1	162.2	162.2	162.2
m ²	7.5	7.5	15.1	15.1	15.1
With Service Clearance					
ft ²	232.4	232.4	442.1	442.1	442.1
m ²	21.6	21.6	41.1	41.1	41.1
Weight					
lb	6,461	6,971	12,972	13,480	13,992
kg	2,931	3,162	5,884	6,115	6,347
Temperature Requirements					
Underfloor Air					
°F	50-66	50-66	50-66	50-66	50-66
°C	10-19	10-19	10-19	10-19	10-19
Room Air					
°F	60-90	60-90	60-90	60-90	60-90
°C	16-32	16-32	16-32	16-32	16-32
Humidity Requirements (%)					
Underfloor Air	50-80	50-80	50-80	50-80	50-80
Room Air	20-80	20-80	20-80	20-80	20-80
Customer-Supplied, Chilled-Water Requirements	none	none	none	none	none